Claims

Claim 1. A vacuum ring for use in conjunction with a test plate on a component testing system, the vacuum ring comprising:

a metallic base material that defines at least one vacuum-communicating passageway, the metallic base material having a test-plate-facing first surface; and

means for improving abrasion resistance of the vacuum ring, including a ceramic layer disposed on the test-plate-facing first surface of the metallic base material.

Claim 2. A vacuum ring as recited in claim **1**, wherein the metallic base material is at least partially composed of aluminum and the ceramic layer is composed of alumina.

Claim 3. A vacuum ring as recited in claim **1**, wherein the ceramic layer is no less than about 20 micrometers thick.

Claim 4. A vacuum ring as recited in claim 1, wherein the ceramic layer is no greater than about 100 micrometers thick.

Claim 5. A vacuum ring as recited in claim 1, wherein the ceramic layer is bonded to the metallic base material by molecular adhesion.

Claim 6. A vacuum ring as recited in claim 1, wherein the ceramic layer is formed on the metallic base material by a micro-arc oxidation process.

Claim 7. A test plate for holding DUTs, comprising:

a DUT-holding structure that defines at least one DUT-receiving hole, said DUT-holding structure being composed at least partially of a metallic material that has oppositely facing first and second outer surfaces; and

means for improving abrasion resistance of the test plate, including a ceramic layer disposed on at least the first outer surface of the DUT-holding structure.

Claim 8. A test plate as recited in claim 7, wherein the DUT-holding structure is at least partially composed of aluminum and the ceramic layer is composed of alumina.

Claim 9. A test plate as recited in claim 7, wherein the ceramic layer is no less than about 20 micrometers thick.

Claim 10. A test plate as recited in claim 7, wherein the ceramic layer is no greater than about 100 micrometers thick.

Claim 11. A test plate as recited in claim 7, wherein the ceramic layer is bonded to the DUT-holding structure by molecular adhesion.

Claim 12. A test plate as recited in claim 7, wherein the ceramic layer is formed on the DUT-holding structure by a micro-arc oxidation process.

Claim 13. A test plate as recited in claim 7, wherein the DUT-holding structure includes an internal wall that defines the DUT-holding hole and the ceramic layer covers the internal wall.

Claim 14. A test plate as recited in claim 7, wherein the ceramic layer covers both the first and second surfaces and the internal wall in order to enable use of the DUT-holding structure as a guard layer that is held at a selected electrical potential for testing purposes.

Claim 15. A vacuum ring for use in conjunction with a test plate on a component testing system for testing DUTs such that each DUT has a cross sectional area less than a predetermined minimum cross sectional area, the vacuum ring comprising:

a base; and

means for ejecting DUTs from the test plate, said means including an eject hole pattern defined by the base for discharging compressed gas toward the DUTs;

wherein the eject hole pattern includes a plurality of closely spaced apart individual holes such that each of the individual holes has a cross sectional area that is less than the size that would be large enough to receive a DUT having the predetermined minimum cross sectional area;

whereby the number of holes affecting a particular DUT for DUT ejection purposes is dependent on the cross sectional size of that particular DUT.

Claim 16. A vacuum ring as recited in claim **15**, wherein the holes have uniform circular shapes with diameters of about five mils.

Claim 17. A vacuum ring as recited in claim **15**, further comprising a ceramic layer on the base.